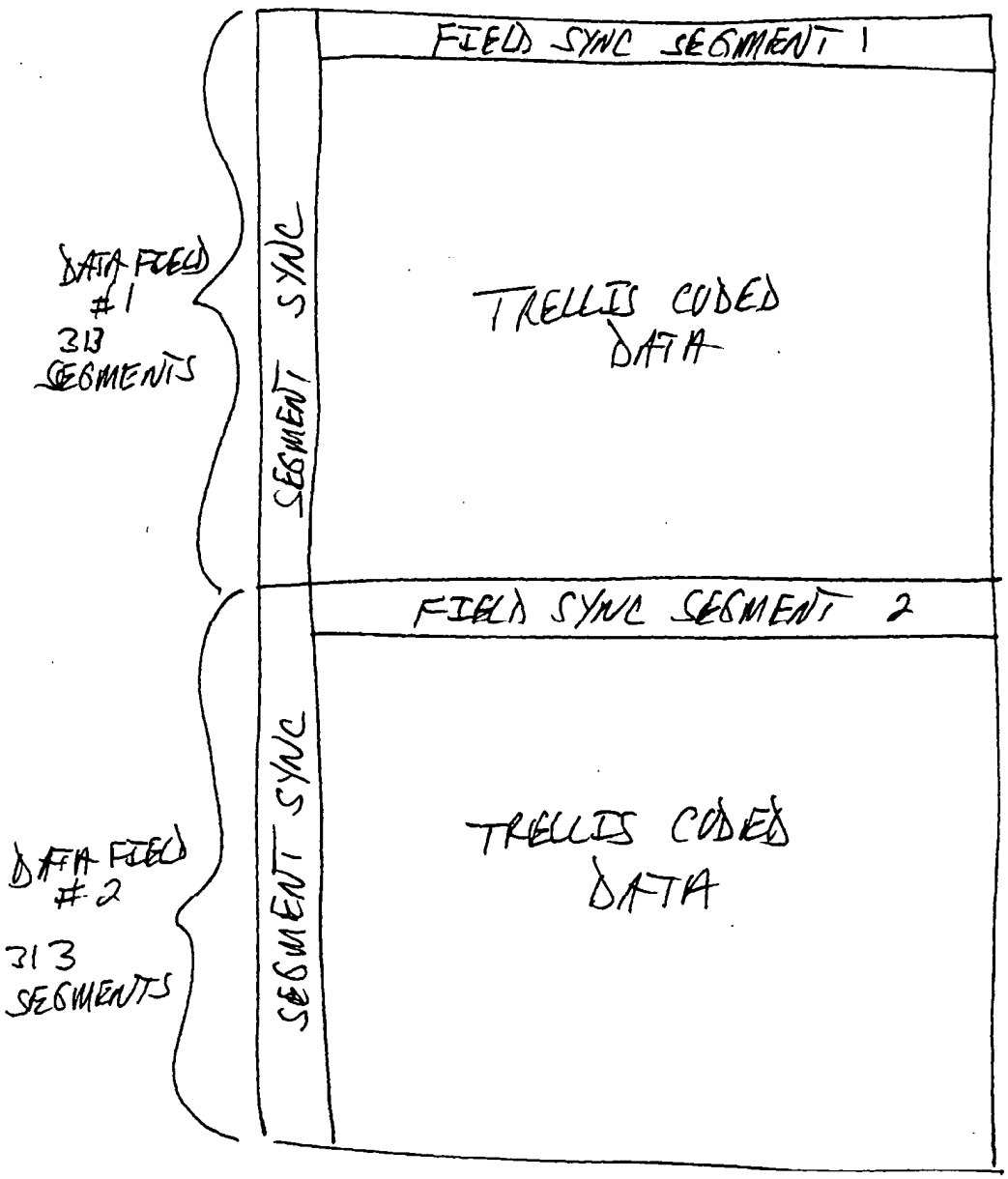
FIELD SYNC SEGMENT 1
SEGMENT SYNC
TRELLIS CODED DATA
DATA FIELD #1
313 SEGMENTS
FIELD SYNC SEGMENT 2
SEGMENT SYNC
TRELLIS CODED DATA
DATA FIELD #2
313 SEGMENTS

FIGURE 1

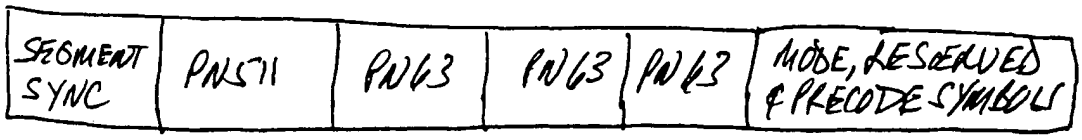

FIGURE 2

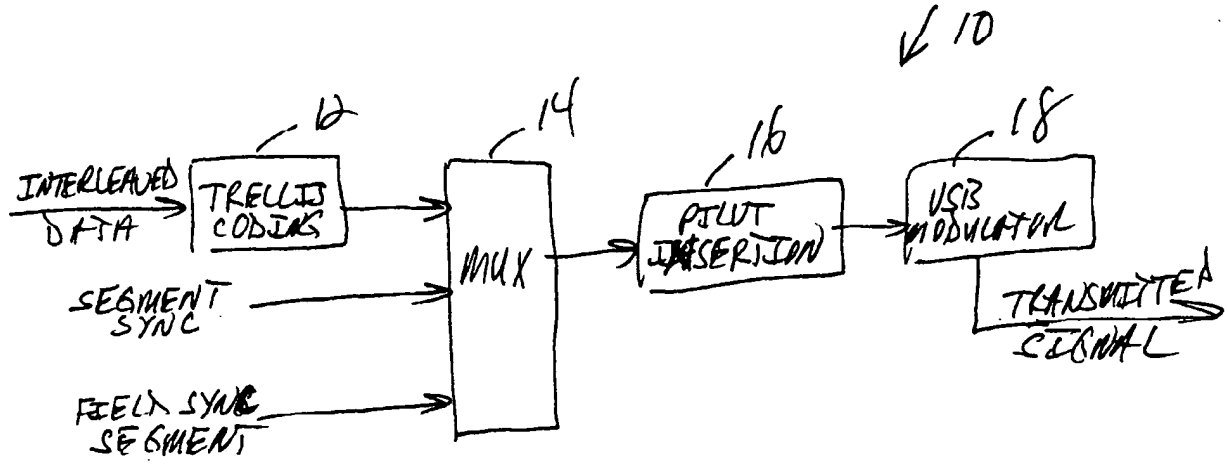

FIGURE 3

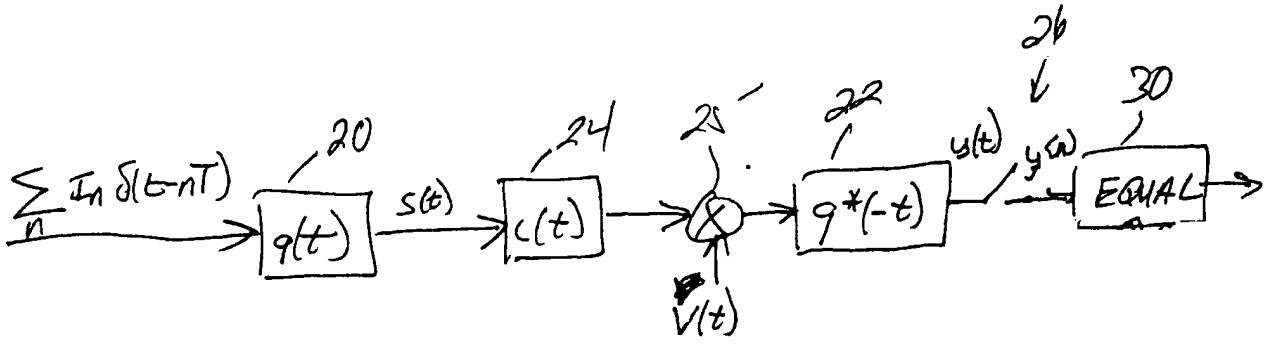

FIGURE 4

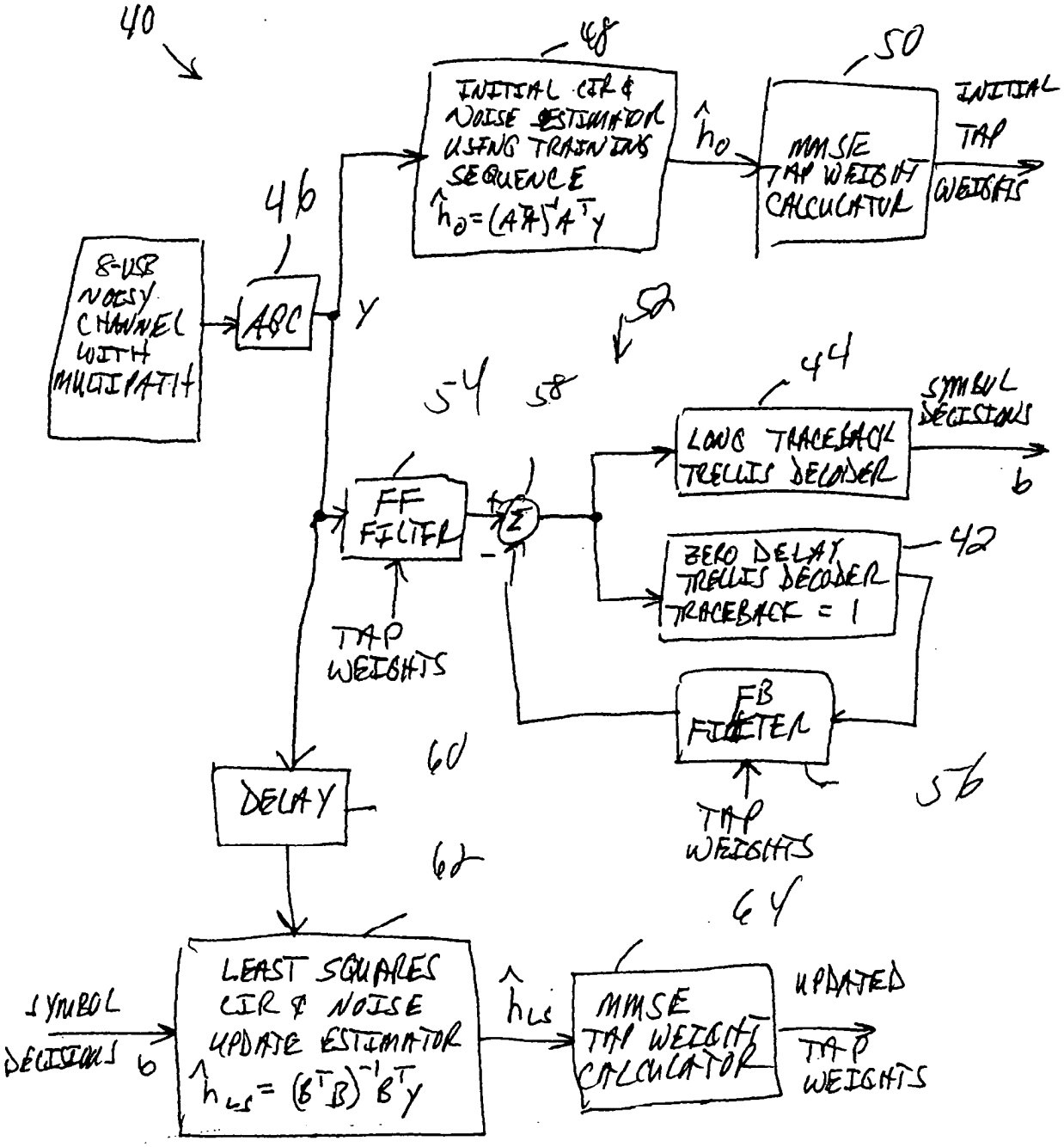
40
48
INITIAL CIR & NOISE ESTIMATOR USING TRAINING SEQUENCE
$\hat{h}_0 = (A^T A)^{-1} A^T y$
$\hat{h}_0$
50
MMSE TAP WEIGHT CALCULATOR
INITIAL TAP WEIGHTS
46
8-US NOISY CHANNEL WITH MULTIPATH
A/C
y
52
54
58
44
LONG TRACEBACK TRELLIS DECODER
SYMBOL DECISIONS
b
FF FILTER
Σ
ZERO DELAY TRELLIS DECODER TRACEBACK = 1
42
TAP WEIGHTS
FB FILTER
56
60
DELAY
62
64
LEAST SQUARES CIR & NOISE UPDATE ESTIMATOR
$\hat{h}_{LS} = (B^T B)^{-1} B^T y$
$\hat{h}_{LS}$
MMSE TAP WEIGHTS CALCULATOR
UPDATED TAP WEIGHTS
SYMBOL DECISIONS
b

FIGURE 5

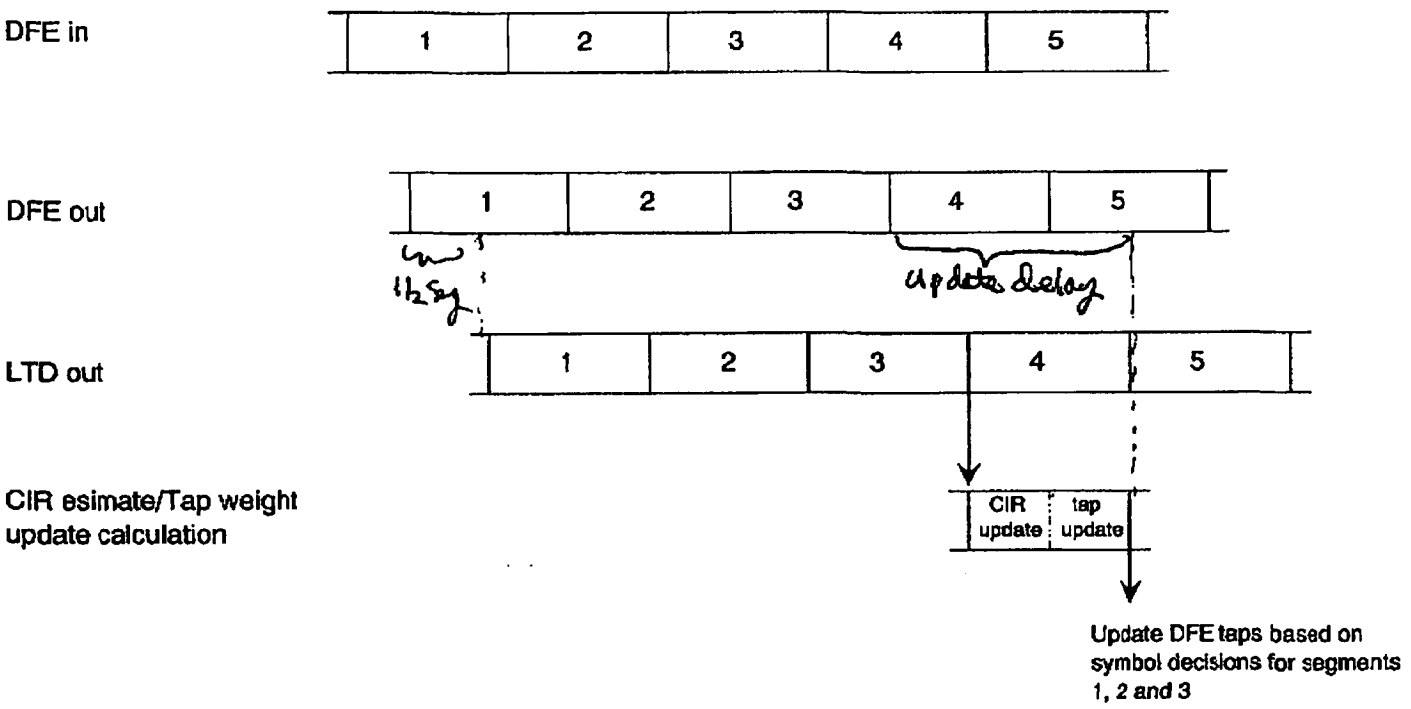
DFE in
1
2
3
4
5
DFE out
1
2
3
4
5
Update delay
LTD out
1
2
3
4
5
CIR esimate/Tap weight update calculation
CIR update
tap update
Update DFE taps based on symbol decisions for segments 1, 2 and 3

FIGURE 6

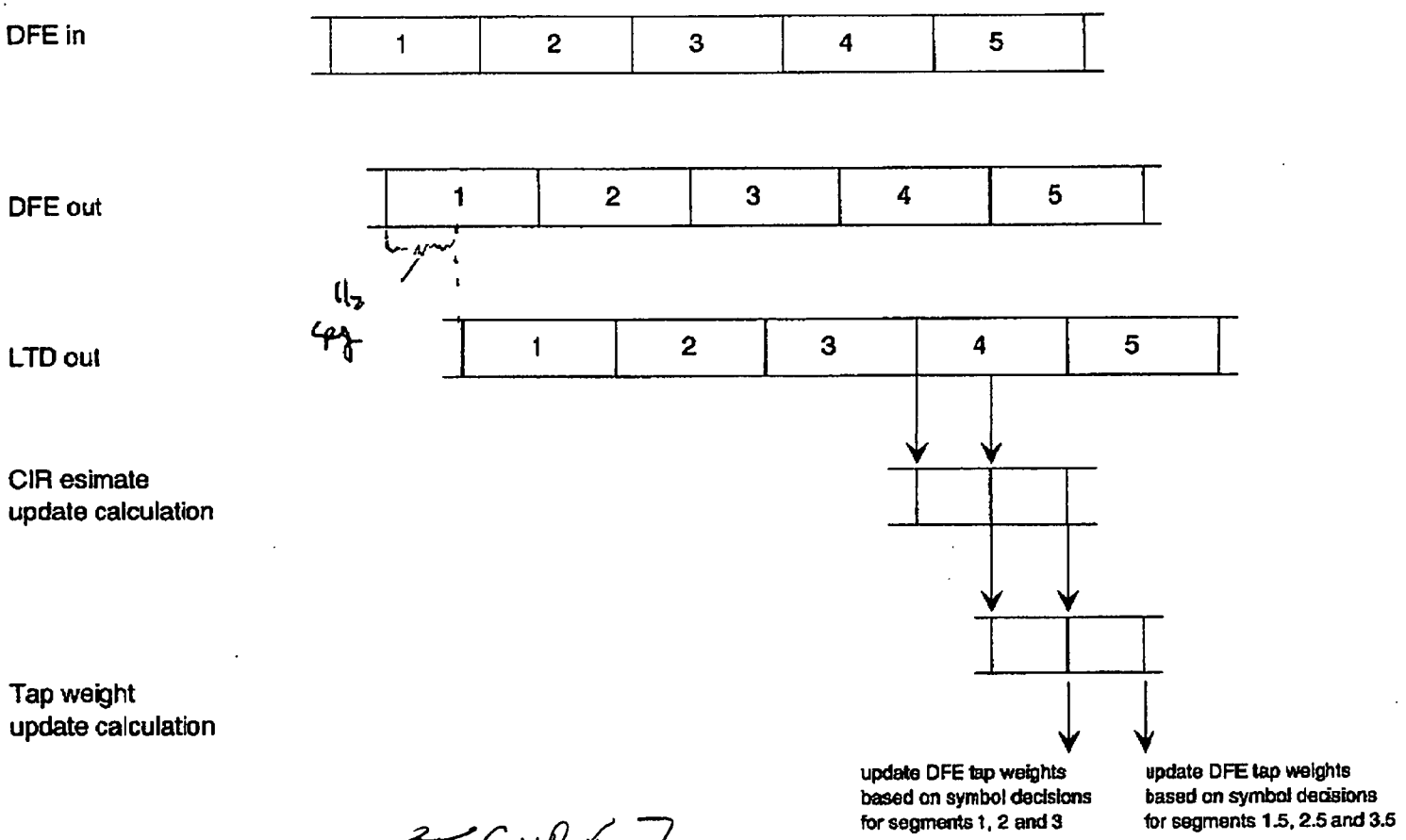
DFE in
1
2
3
4
5
DFE out
1
2
3
4
5
LTD out
1
2
3
4
5
CIR esimate update calculation
Tap weight update calculation
update DFE tap weights based on symbol decisions for segments 1, 2 and 3
update DFE tap weights based on symbol decisions for segments 1.5, 2.5 and 3.5

FIGURE 7

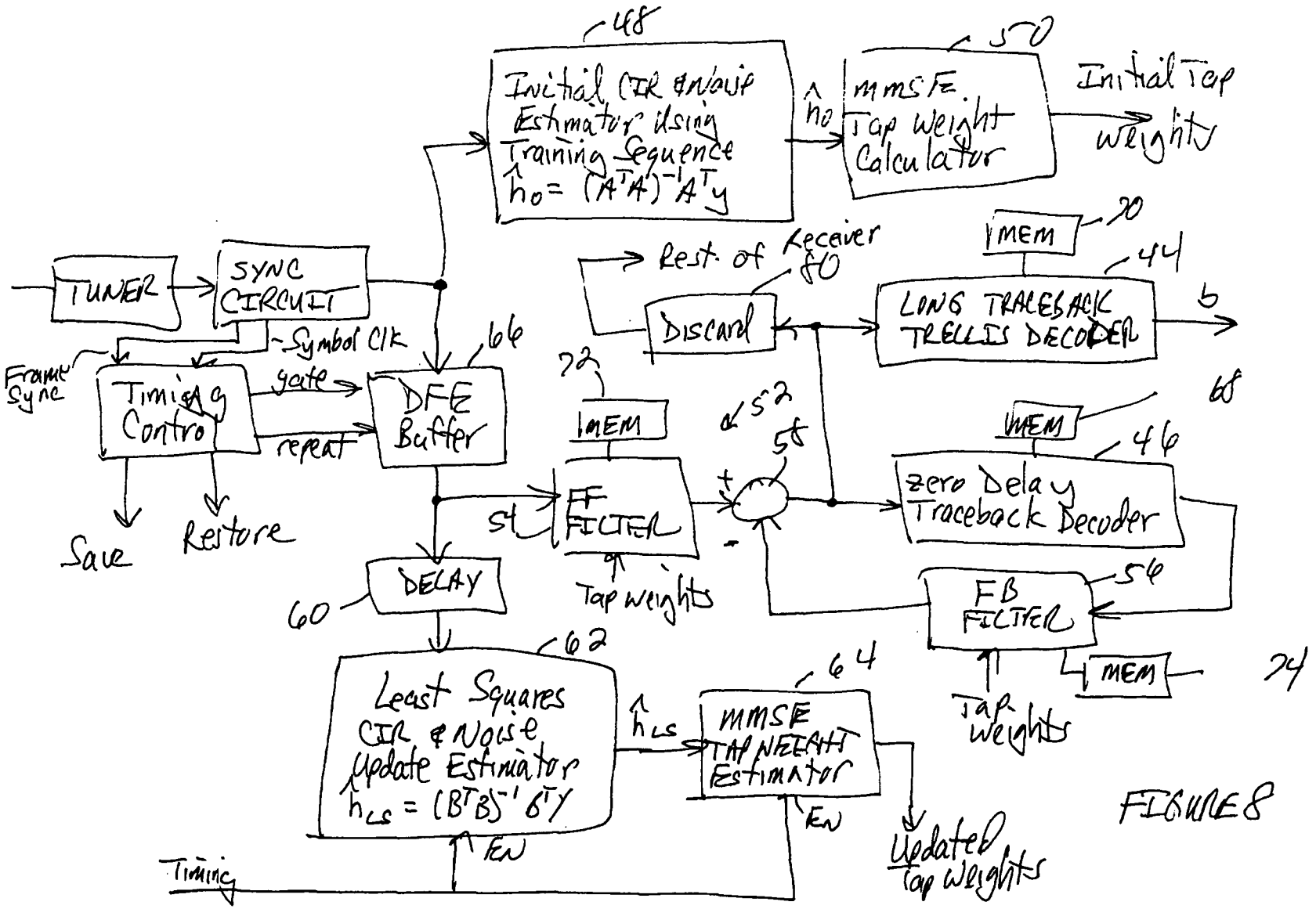
48
Initial CIR and/or Estimator using Training Sequence
$\hat{h}_0 = (A^TA)^{-1}A^Ty$
$\hat{h}_0$
50
MMSE Tap Weight Calculator
Initial Tap weights
Rest of Receiver
60
Discard
IMEM
20
44
LONG TRACEBACK TRELLIS DECODER
b
TUNER
SYNC CIRCUIT
Symbol Clk
Frame Sync
Timing Contro
gate
repeat
66
DFE Buffer
22
IMEM
FF FILTER
Tap weights
52
54
IMEM
68
46
zero Delay Traceback Decoder
FB FILTER
56
MEM
24
Tap weights
Save
Restore
DELAY
60
62
Least Squares CIR & Noise Update Estimator
$\hat{h}_{LS} = (B^TB)^{-1}B^Ty$
$\hat{h}_{LS}$
64
MMSE TAP WEIGHT Estimator
EN
EN
Updated Tap weights
Timing

FIGURE 8

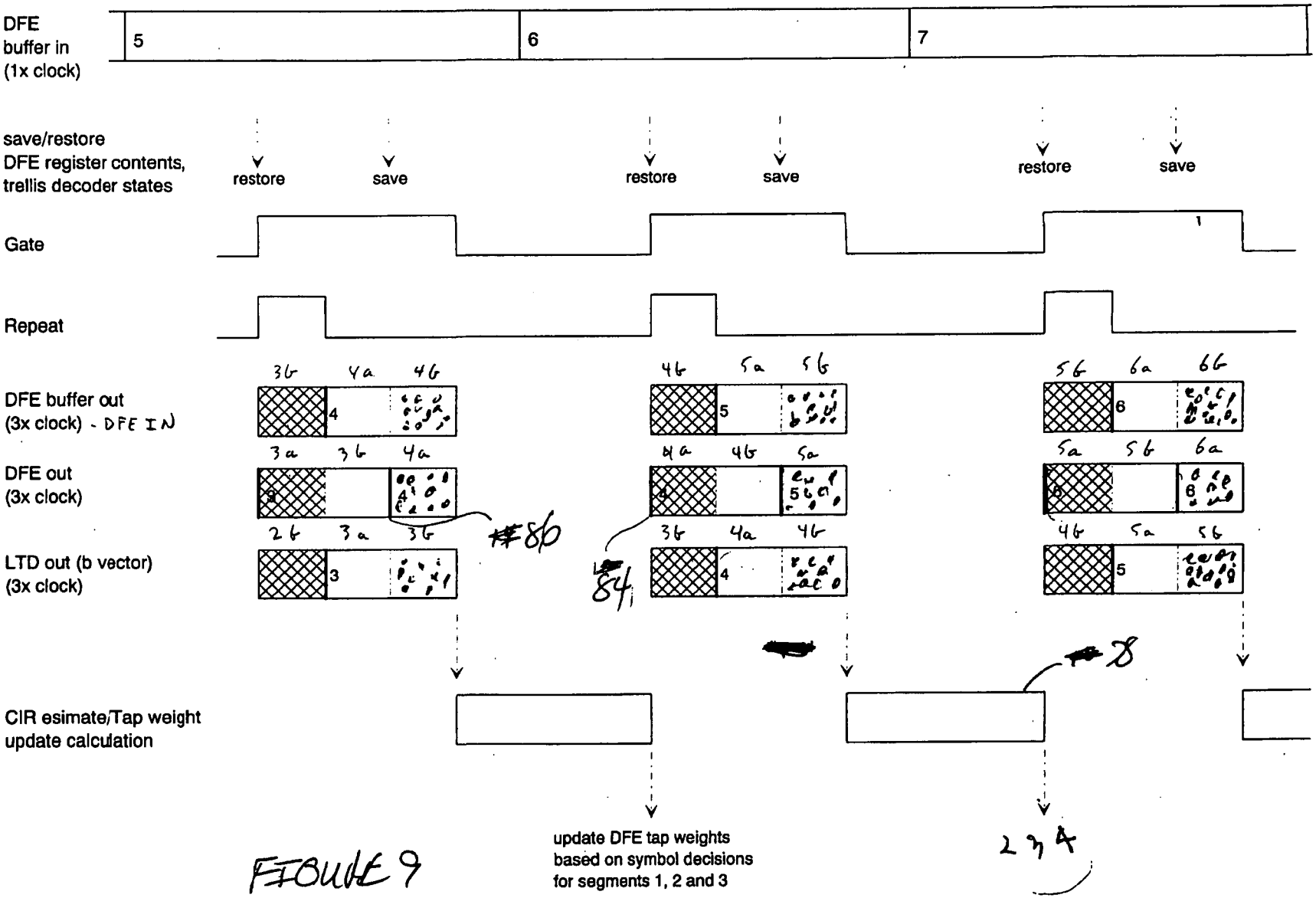
DFE
buffer in
(1x clock)
5
6
7
save/restore
DFE register contents,
trellis decoder states
restore
save
restore
save
restore
save
Gate
Repeat
DFE buffer out
(3x clock) - DFE IN
DFE out
(3x clock)
LTD out (b vector)
(3x clock)
CIR esimate/Tap weight
update calculation
update DFE tap weights
based on symbol decisions
for segments 1, 2 and 3

FIGURE 9